

Plant Pathology Fact Sheet

Wheat Bacterial Streak/Black Chaff

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IMPORTANCE

Occasionally, wheat leaves and spikes are invaded by the bacterium, *Xanthomonas campestris* pv. *translucens*. When leaf tissue is affected, the resulting disease is known as bacterial streak. When the bacterium invades the head, the disease is called black chaff. While this disease has primarily been a problem in the lower mid-South, it is often found in Kentucky in fields that have been impacted by strong winds with blowing soil or following a damaging freeze. Wind-blown soil particles and freeze damage both cause small tissue wounds and provide places of entry for the bacterium. Symptoms commonly appear a few days after windy weather or the freeze event. When the disease is associated with blown soil particles, symptoms are frequently most severe near the edges of fields that are closest to gravel, dirt or paved roads. The bacterium is also seed-borne, but seed germination is little impacted.

Neither bacterial streak nor black chaff, have caused much damage in Kentucky. However, the appearance of symptoms often raises considerable concern by producers. In addition, bacterial streak/black chaff is easily confused with a widespread



BACTERIAL STREAK SYMPTOMS

genetic discoloration of wheat glumes common in certain varieties, leaf and glume blotch (caused by the fungus *Stagonospora nodorum*), and a range of other fungal diseases. Accurate identification of the cause of symptoms will prevent producers from applying a fungicide to control what is actually a bacterial or genetic problem (fungicides have no effect on either situation).

LEAF SYMPTOMS

Infections start as small water-soaked spots, usually on upper leaves. These spots enlarge, coalesce, and become glossy.

Eventually infection sites become olive green translucent streaks of various lengths that later turn yellow-brown. Streaks may extend the length of a leaf and are usually somewhat narrow, being limited by leaf veins. Spots may become large and blotchy, causing the leaf to shrivel, often dying from the tips back. Infected areas tend to glisten in the sun, particularly under humid conditions.

These symptoms may be confused with leaf blotches caused by various fungal pathogens, especially *Stagonospora* leaf blotch. Generally however, spore-producing structures appear as tiny black or brown specks in the fungal-incited lesions; these signs are lacking in lesions associated with bacterial streak.

HEAD SYMPTOMS

Infected glumes will have dark, longitudinal streaks and spots that are more abundant on the upper parts of glumes. Beards of bearded varieties can also be affected. Grain is usually marginally impacted, but in extreme cases, grain may be brown and shriveled. Yield effects are most pronounced when the bacteria invade the stem, usually just below the head and in upper joints.



BLACK CHAFF SYMPTOMS

DISEASE DEVELOPMENT

The bacterium causing bacterial streak/black chaff is seed-borne, and overwinters in residue, in various weeds, and in field soil. The causal bacterium is spread within a field primarily by blown soil particles,

but also by splashing rain, plant-to-plant contact, and insects. The pathogen cannot infect wheat tissue directly, so it must enter plants via natural openings or wounds. Free water is necessary for infection. As a result, symptoms of the disease usually appear after several days of damp, rainy weather.

DISEASE MANAGEMENT

Bacterial streak/black chaff is difficult to control; however, the following practices may help.

- Best results can be obtained by using only certified seed and allowing 2 years between wheat crops in a field. Do not rotate wheat with barley as the bacterium will be maintained in the field at high levels.
- Current research has indicated varying degrees of susceptibility for different varieties. However, this information is not sufficiently developed to be used as a reliable control measure.
- The use of agronomic practices and varieties that minimize the chances of a field sustaining early spring freeze damage will help avoid serious damage due to bacterial streak/black chaff.
- Control insects, where practical, to reduce the frequency of sites available for the causal bacterium to move and enter plant tissue.

ADDITIONAL RESOURCES

Disease management and crop production advice can be found in the following University of Kentucky publications available at County Extension offices, as well as on the Internet.

- Comprehensive Guide to Wheat Management in Kentucky: Disease Management (Section 7) ID-125 (2009) <http://www.ca.uky.edu/agc/pubs/id/id125/07.pdf>

- Kentucky Integrated Crop Management Manual for Small Grains, IPM-4 (2009)
<http://www.uky.edu/Ag/IPM/manuals/ipm4smgr.pdf>
- Kentucky Plant Disease Management Guide for Small Grains, PPA-10c (1993)
<http://www.ca.uky.edu/agc/pubs/ppa/ppa10c/ppa10c.pdf>

- No-Till Small Grains Production in Kentucky, ID-136 (2000)
<http://www.ca.uky.edu/agc/pubs/id/id136/id136.htm>

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Photos by Don Hershman, University of Kentucky (foliar symptoms) and Mary Burrows, Montana State University, Bugwood.org (head symptoms)

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